SQL

Ray

SCHEDULE

- Recap / HW
- table manipulation statement and constraints
- More practices?
- HW

RECAP/ HW

- NORMAL FORM

	UNF (1970)	1NF (1970)	2NF (1971)	3NF (1971)
Primary key (no duplicate tuples)[4]	✓	✓	✓	✓
Atomic columns (cells cannot have tables as values)[5]	✗	✓	✓	✓
Every non-trivial functional dependency either does not begin with a proper subset of a candidate key or ends with a prime attribute (no partial functional dependencies of non-prime attributes on candidate keys)[5]	✗	✗	✓	✓
Every non-trivial functional dependency either begins with a superkey or ends with a prime attribute (no transitive functional dependencies of non-prime attributes on candidate keys)[5]	✗	✗	✗	✓
Every non-trivial functional dependency either begins with a superkey or ends with an elementary prime attribute	✗	✗	✗	✗

SQL INJECTION

- What's sql injection?
- Mallicious code
- Famous example: and 1=1

Create table statement

- Creates a new table in SQL Server and Azure SQL Database.

CREATE TABLE STATEMENT

- SYNTAX
- CREATE TABLE *TABLE_NAME* (
  COLUMN1 DATATYPE,
  COLUMN2 DATATYPE,
  COLUMN3 DATATYPE,
  ....
  );
- WHAT SHOULD BE USED FOR THE FOLLOWING TABLE NAMED 'CONATCT'? ANS IN NEXT PAGE DON'T PEEK

UID	First Name	Last name	phone
234856	Charlie	Brown	(734)828-4632
123456	Charlie	Brown	(202)549-4678

CREATE TABLE STATEMENT PRACTICE 1

UID	First Name	Last name	phone
234856	Charlie	Brown	(734)828-4632
123456	Charlie	Brown	(202)549-4678

- ```
  Create table contact (
   UID int,
  First_Name varchar(20),
  Last_Name varchar(20),
  phone varchar(15)
  );
  ```
  ```

CREATE TABLE STATEMENT PRACTICE 2

- WHAT SHOULD BE USED FOR 'TRANSACTION'? ANS IN NEXT PAGE DON'T PEEK

TID	Payer	Payee	amount	currency	timestamp	note
00001	258548	12346987	210.89	USD	2022/01/25 22:10:53	rent
00002	260789	210987321	12378.2	USD	2022/01/25 22:10:53	
00003	165399	13201498	50000	NTD	2022/01/25 22:10:54	loan

CREATE TABLE STATEMENT PRACTICE 2

TID	Payer	Payee	amount	currency	timestamp	note
00001	258548	12346987	210.89	USD	2022/01/25 22:10:53	rent
00002	260789	210987321	12378.2	USD	2022/01/25 22:10:53	
00003	165399	13201498	50000	NTD	2022/01/25 22:10:54	loan

- CREATE TABLE TRANSACTION (
  TID CHAR(5),
  PAYER VARCHAR(10),
  PAYEE VARCHAR(10),
  AMOUNT FLOAT,
  CURRENCY VARCHAR(3),
  TIMESTAMP DATETIME,
  NOTE VARCHAR(256)
)

WHAT IF...?

- Table already exists and I only want to add a column?
- Table already exists and I only want to drop a column?
  - ALTER TABLE statement
- Syntax:
  - ALTER TABLE *table_name*
    DROP COLUMN column_name;
    ADD COLUMN column_name;
    MODIFY(ALTER) COLUMN column_name;

ALTER TABLE STATEMENT PRACTICE

- GIVEN TABLE TRANSACTION

TID	Payer	Payee	amount	currency	timestamp	note
00001	258548	12346987	210.89	USD	2022/01/25 22:10:53	rent
00002	260789	210987321	12378.2	USD	2022/01/25 22:10:53	
00003	165399	13201498	50000	NTD	2022/01/25 22:10:54	loan

Please modify table such that it looks like this…

TID	Payer	Payee	amount	currency	Date	time	note
00001	Charlie	Annie	210.89	USD	2022/01/25	22:10:53	rent
00002	Charlie	Joy	12378.2	USD	2022/01/25	22:10:53	
00003	John	Pheobe	50000	NTD	2022/01/25	22:10:54	loan

ALTER TABLE STATEMENT PRACTICE

- Payer and payee updated to name
- Timestamp split into 2 columns: date and time
- ALTER TABLE transaction (
  DROP TIMESTAMP;
  ADD DATE DATE;
  ADD TIME TIME;
  );

What if...?

- No longer want certain table?
  - **DROP TABLE** statement
- Want to clean the data within a table?
  - **TRUNCATE TABLE** statement

Table Manipulation Statements -Summary

- To create a new table
- To change content of an existing table
- To erase contents of a table
- To delete the entire table

TABLE MANIPULATION STATEMENTS -SUMMARY

- To create a new table – CREATE TABLE
- To change content of an existing table – ALTER TABLE
- To erase contents of a table – TRUNCATE TABLE
- To delete the entire table – DROP TABLE

CONSTRAINTS

- SQL constraints are used to specify rules for data in a table.
- WHY?
  - Online check, upon data is entering, instantly check whether the data is valid or not.
  - Integrity

COMMON CONSTRAINTS

- NOT NULL - Ensures that a column cannot have a NULL value
- UNIQUE - Ensures that all values in a column are different
- PRIMARY KEY - A combination of a NOT NULL and UNIQUE. Uniquely identifies each row in a table
- FOREIGN KEY - Prevents actions that would destroy links between tables
- CHECK - Ensures that the values in a column satisfies a specific condition
- DEFAULT - Sets a default value for a column if no value is specified
- CREATE INDEX - Used to create and retrieve data from the database very quickly

Source: https://www.w3schools.com/sql/sql_constraints.asp

QUICK EXAMPLE ON CONSTRAINTS

TID	Payer	Payee	amount	currency	timestamp	note
00001	258548	12346987	210.89	USD	2022/01/25 22:10:53	rent
00002	260789	210987321	12378.2	USD	2022/01/25 22:10:53	
00003	165399	13201498	50000	NTD	2022/01/25 22:10:54	loan

- Given transaction table
- Constraints:
  - Payer, payee, amount cannot be null
  - Note is optional
  - Tid is the primary key
  - Payer, payee is foreign key referencing 'USER' table 'UID' column
  - Single transaction cannot exceed 450000NTD or 15000USD

CREATE TABLE STATEMENT PRACTICE 2

TID	Payer	Payee	amount	currency	timestamp	note
00001	258548	12346987	210.89	USD	2022/01/25 22:10:53	rent
00002	260789	210987321	12378.2	USD	2022/01/25 22:10:53	
00003	165399	13201498	50000	NTD	2022/01/25 22:10:54	loan

- CREATE TABLE TRANSACTION (
  TID CHAR(5) ,
  PAYER VARCHAR(10) ,
  PAYEE VARCHAR(10) ,
  AMOUNT FLOAT NOT NULL ,
  CURRENCY VARCHAR(3),
  TIMESTAMP DATETIME,
  NOTE VARCHAR(256),
  ADD CONSTRAINT CHK_NTD_AMOUNT CHECK (CURRENCY = 'NTD' AND AMOUNT <= 450000),
  ADD CONSTRAINT CHK_USD_AMOUNT CHECK (CURRENCY = 'USD' AND AMOUNT <= 15000),
  PRIMARY KEY (TID),
  FOREIGN KEY (PAYER) REFERENCES USER(UID),
  FOREIGN KEY (PAYEE) REFERENCES USER(UID)
)

More practices?

- Exam practice if time permits
- Udemy

HW

- *Here we go again….*
- Design a schema (more than one table)that met the following requirement ~~and estimate the memory size of which you design~~ and construct proper constraints and design a 3-NF table using create table statement
  - ~~4000 students~~
  - Constraints
    - Grade must be letter grade (i,e within A, B, C, D, E, F)
    - Emergency number cannot be blank
  - Must be able to query:
    - Public accessible info:
      - Student id, start with 0001
      - First name
      - Last name
      - Sex
      - Enrollment class id
    - Locked info:
      - Home address
      - Emergency contact number
      - Grade